(*Anarrhichas*) 20 inches (?). In most cases these small specimens were males, as in the even more remarkable case of the salmon—in which the milt of a parr a few inches long can be utilized for the successful fertilization of the ova of an adult female salmon. There would therefore be grounds for saying that fishes of a less size than the foregoing are immature. From these observations it will be seen that the minimum size of 12 inches for turbot and brill—adopted by the representatives of the sea-fishing industry of the United Kingdom in June of this year—does not err on the side of excess. Further, since the mature males are often so much smaller than the females, it is apparent that the same restrictive size would not be practicable, though the numbers of the mature females are of greater importance for the welfare of the fisheries than those of the males.

While, therefore, many difficulties beset legislative measures for the preservation of the young fishes, there need be no halt in the efforts of the fishery authorities in investigating the deep-sea fishing grounds far from shore; and this should be carried out as far as practicable and as frequently as possible every month of the year. A comparison of the surface, mid-water, and bottom fauna there with that already known to exist in such bays as St. Andrews could not fail to give valuable and interesting data. Besides, the gaps in the life-histories of the post-larval and young stages of many fishes would thus be more or less bridged over. Finally, there can be little doubt of the expediency of at once providing suitable open-air tanks, *e.g.* at St. Andrews, in communication with the tidal water for the study of the post-larval and young stages of food-fishes, especially with regard to their rate of growth. It has yet to be proved also whether it would be best to place the larvæ of valuable fishes, such as turbot, brill, and soles, in the sea, or to keep them till the post-larval or young stages are reached. W. C. MCINTOSH.

ESTABLISHMENT OF SCIENCE SCHOLARSHIPS.

WE have already called attention to the science scholarships which are being established by the Commissioners for the Exhibition of 1851. The official statement on the subject is as follows :—

In their seventh report to the Crown, presented in July 1889, the Commissioners for the Exhibition of 1851 announced their intention of appropriating an annual sum of not less than £5000 a year to the establishment of scholarships, to enable the most promising students in provincial colleges of science to complete their studies either in those colleges or in the larger institutions of the metropolis, care being taken that these scholarships should be a supplement to, and not in competition with, scholarships already existing through either public action or private endowment.

The decision to restrict the scheme of scholarships to provincial colleges was due to the feeling of the Commissioners that the provinces, which took so large a part in supporting the Great Exhibition of 1851, had a just claim to receive as direct a benefit from the funds derived from that Exhibition as is afforded to the institutions on the Commissioners' Estate at South Kensington, which, although unquestionably of national importance, confer a more immediate advantage on the metropolis.

To assist them in preparing a scheme for the distribution and regulation of the scholarships' the Commissioners obtained the services of a committee of eminent men of science—namely, Prof. Garnett, Prof. Huxley, Prof. Norman Lockyer, Sir Henry Roscoe, and Sir William Thomson. To these were added two Commissioners, Mr. Mundella and Sir Lyon Playfair, the latter of whom acted as chairman of the committee.

On the 18th of June last this committee presented the accompanying report on the scope and objects of the scholarships, and it has been adopted by the Commissioners.

The committee then considered the manner in which the scholarships should be distributed. On this point they were bound by the restriction of the present scheme to students in provincial institutions, in which term, however, they suggested that colonial Universities might be comprised. They thought it unnecessary to include in the scheme the Universities of Oxford, Cambridge, and Dublin, in view of the large endowments of those bodies. The committee decided upon the allotment of an annual series of seventeen scholarships in the manner shown by the accompanying list, and the institutions named in the list will be invited to nominate scholars, subject to the conditions laid down in the report of the committee, and provided that they possess scholars worthy of the purposes explained in it.

The present allotment is to be considered experimental and temporary, and the selection now made of institutions to which nominations are offered will be subject to modification in the future, having regard not only to the manner in which the nominations are exercised, but also to the claims of other Universities and colleges which may from time to time be brought under the consideration of the Commissioners.

Provincial and Colonial Universities and Colleges.

Scholarships Annually.		
	1	University of Edinburgh.
	1	University of Glasgow.
Alternately .	1	University of St. Andrews (including University College, Dundee). University of Aberdeen.
	1	Mason College of Science, Birmingham.
	1	Bristol University College.
	1	Durham College of Science, Newcastle.
	1	Yorkshire College of Science, Leeds.
	1	Liverpool University College.
	1	Owens College, Manchester.
	1	Nottingham University College.
	1	Firth College, Sheffield.
Alternately .	1	Aberystwith (University College of Wales). Bangor (University College of North Wales). Cardiff (University College of South Wales).
In each year	2	Belfast, Queen's College. Cork, Queen's College. Galway, Queen's College. Dublin, Royal College of Science.
		Canada :—
Alternately .	1	M'Gill College, Montreal. University of Toronto.
		Australia :—
In each year	2	University of Sydney. University of Melbourne. University of Adelaide. University of New Zealand.
	17	

The following is the first report of the committee for considering the regulation and distribution of the science scholarships :—

The committee have had their attention drawn to the fact that there is a large number of scholarships in the country; that they are increasing at a rapid rate; and, if the Commissioners act on the same lines as those already occupied, it is possible that education will gain little by their action, as the endowment of the Commissioners may interfere with the establishment of new scholarships by private liberality.

Hence it is desirable that the scholarships with which this committee have to deal should be of a higher order than most of those now existing; in fact, their functions should begin where the ordinary educational curriculum ends. This system has been adopted with excellent effects by the French *École pratique des hautes études*.

The committee propose :—(1) That the scholarships shall be of £150 a year in value, and shall be tenable for two years, but in rare instances may be extended to three years by special resolution of the Commissioners. The continuation, each year after the first, shall depend upon the work done in the previous year being satisfactory to the scientific committee which it is suggested shall be appointed by the Commissioners.

(2) That the scholarships shall be limited to those branches of science (such as physics, mechanics, and chemistry) the extension of which is specially important for our national industries.

(3) That the Commissioners shall from time to time select a certain number of provincial and colonial colleges in which special attention is given to scientific education, and give to each

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the power of nominating a student of not less than three years' standing to a scholarship, on the condition that he indicates high promise of capacity for advancing science or its applications.

(4) That the Commissioners shall appoint a committee of advice, who will consider and report upon the reasons for which the nominations are made by the respective colleges, and the Commissioners will appoint to the scholarships upon the report of their committee.

(5) That the scholarships when awarded shall be tenable in any University either at home or abroad, or in some other institution to be approved of by the Commissioners. The holder of a scholarship must give an undertaking that he will wholly devote himself to the object of the scholarship, and that he will not hold any position of emolument during its continuance.

LYON PLAYFAIR, Chairman.
WM. GARNETT.
T. H. HUXLEY.
J. NORMAN LOCKYER.
A. J. MUNDELLA.
HENRY E. ROSCOE.
WILLIAM THOMSON.

SCIENTIFIC SERIALS.

American Journal of Science, August 1890.—On the cheapest form of light, from studies at the Allegheny Observatory, by S. P. Langley and F. W. Very. The authors have made a long and interesting series of observations, by means of the bolometer and spectroscope, on the light radiated by the fire-fly (*Pyrophorus noctilucus*, Linn.) found in Cuba and elsewhere. It has been previously shown that in all industrial methods of producing light, like the candle, lamp, or gas, more than 99 per cent. of the energy is, as far as illumination goes, wasted; and in sources of higher temperature, like the incandescent light and electric arc, even under the most favourable conditions, an enormous waste is involved. The study of the radiation of the fire-fly demonstrates that it is possible to produce light without heat other than in the light itself; that this is actually effected by nature's processes; and that these are "cheaper," that is, more economical in energy, than any industrial method now known. From the observations and facts given there seems no reason why the light should not one day be produced in the laboratory, and used for industrial purposes.—Contributions to mineralogy, No. 48, by F. A. Genth. Analyses are given of the following minerals: tetradymite, pyrite, quartz (pseudomorphous after stibnite), gold in chromiferous clay from Los Cerillos, New Mexico, zircon, scapolite, garnet, titaniferous garnet, allanite, and lettsomite from Arizona and Utah.—A curious occurrence of vivianite, by Wm. L. Dudley.—Classification of the glacial sediments of Maine, by George H. Stone.—The direct determination of bromine in mixtures of alkaline bromides and iodides, by F. A. Gooch and J. R. Ensign. The method described is as follows: the neutral solution containing the bromide and iodine is diluted to 600 c.c. or 700 c.c., and about 1 c.c. or 1·5 c.c. of strong sulphuric acid, or from 2 c.c. to 3 c.c. of the acid mixed with an equal volume of water, are added; a sufficient amount of sodium or potassium nitrite is then introduced, and the liquid is boiled until the colour has disappeared and the escaping steam no longer gives to red litmus-paper the characteristic colour of iodine. The residual liquid is then treated with excess of silver nitrate, and the precipitated bromide filtered off, dried, and weighed.—Some Lower Silurian graptolites from Northern Maine, by W. W. Dodge.—Siderite-basins of the Hudson River epoch, by James P. Kimball. Some interesting facts bearing on the structural geology of the Taconic area extending to the Hudson River, and on the geology of the whole Taconic region, are brought together and discussed.—On a new variety of zinc sulphide from Cherokee County, Kansas, by James D. Robertson.—Two new meteoric irons, by F. P. Venable. An analysis of a meteorite from Rockingham County, N.C., gave the result: Fe, 87·01; P, 0·04; SiO_2, 0·53; Cl, 0·39; Ni, 11·69; Co, 0·79 = 100·45. Another meteoric iron from Henry County, Vancouver, gave: Fe, 90·54; Cl, 0·35; SiO_2, 0·04; P, 0·13; Co, 0·94; Ni, 7·70 = 99·70.—Notice of some extinct Testudinata, by O. C. Marsh.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, August 18.—M. Duchartre in the chair.—Contribution to the theory of the experiments of M. Hertz, by M. H. Poincaré. After pointing out an error in the calculations of M. Hertz, an attempt is made, starting with Maxwell's fundamental hypotheses, to develop a more rigorous formula for the rate of propagation of the wave in air.—International meteorological tables, presented by M. Mascart. These are of the form finally decided upon by the International Committee at Zurich, 1888.—Order of appearance of the first vessels in the flowers of some *Tragopogon* and *Scorzonera*, by M. A. Trécul.—Experimental tuberculosis, on a mode of treatment and of vaccination, by MM. J. Grancher and H. Martin. The paper describes the result of some experiments on the inoculation of rabbits. The process described affords a more or less complete protection from tuberculosis to the rabbits inoculated.—On a portable electrical safety-lamp, for use in mines, by M. G. Trouvé. The smallest lamp described, supplied with six Planté accumulators (weight 420 grammes), runs for five hours.—Note on a theorem concerning life annuities, by M. A. Quiquet.—Experiments on transversal magnetization by magnets, by M. C. Decharme.—On an electric lighting-apparatus, for examining the strata in borings, by M. G. Trouvé.—Allyl-cyano-succinic ether; new synthesis by means of cyano-succinic ether, by M. L. Barthe. In this synthesis sodium-cyano-succinic ether is treated in alcoholic solution with allyl iodide. The new ether forms a colourless oil, and distils under 35 mm. pressure at 207°–210°.—Methyl cyano-succinate, and methyl cyano-tri-carballylate, by M. L. Barthe. Both these ethers are produced when sodium-methyl cyanacetate is treated with methyl chloracetate.—Researches on butter and margarine, by M. C. Viollette. This paper contains results of ten complete analyses. By the method given an adulteration of pure butter with ten per cent. of margarine can be detected.—Researches on the optical analysis of butters, by the same. The differences between the values of the refractive indices for pure butter and for margarine are sufficient to serve as the basis of an analytical method.—On a characteristic reaction of cocaine, by M. F. da Silva.

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